Clear Form

Michigan Department of Transportation 5100B (02/06)

CHECKLIST TO DESIGNATE AREAS OF EVALUATION FOR REQUESTS FOR PROPOSAL (RFP)

Exhibit B

PROJECT MANAGER	JOB NUMBER (JN)	CONTROL SECTION (CS)
Zhizhen Liu	85568	Various

DESCRIPTION IF NO JN/CS

The control sections are: 03032,11021,12021, 13082 78061, 80012.

MDOT PROJECT MANAGER: Check all items to be included in RFP.

WHITE = REQUIRED
GRAY SHADING = OPTIONAL

Check the appropriate Tier in the box below

CONSULTANT: Provide only checked items below in proposal.

☑ **TIER I ($25,000-$99,999)**	☐ **TIER II ($100,000-$250,000)**	☐ **TIER III (>$250,000)**	
☑	☐	☐	Understanding of Service
☐	☐	☐	*Innovations*
☑	☐	☐	*Safety Program*
N/A	☐	☐	Organization Chart
☑	☐	☐	Qualifications of Team
☑	☐	☐	Past Performance
Not required as part of official RFP	Not required as part of official RFP	☐	Quality Assurance/Quality Control
☑	☐	☐	Location of Service Personnel **(Only check for on-site inspection services)**
N/A	N/A	☐	Presentation
N/A	N/A	☐	Technical Proposal (if Presentation is required)
3 pages including cover sheet **(No Resumes)**	7 pages	19 pages	Total maximum pages for RFP **not including key personnel resumes**

BUREAU OF HIGHWAYS
REQUEST FOR PROPOSAL
for
QUALIFICATIONS BASED SELECTION FOR PREQUALIFIED SERVICES

The Michigan Department of Transportation (MDOT) is seeking professional services for the project contained in the attached scope of services.

If your firm is currently prequalified for this type of work and you are interested in providing services, please indicate your interest by submitting a Proposal. The Proposal must be submitted in accordance with the latest "Vendor Selection Guidelines for Service Contracts", available on the MDOT website.

For efficiency sake, we are asking that the vendor firm provide **Three** paper copies of the Proposal to the MDOT project manager named in the attached scope of services.

These copies must be received by **04/12/2006 no later than 4:00pm**. Fax and electronic copies are not acceptable.

In addition, provide one unbound copy to:

Regular Mail:
Secretary, Operations Contract Support
Michigan Department of Transportation
P.O. Box 30050
Lansing, MI 48909

OR

Overnight Mail:
Secretary, Operations Contract Support
Michigan Department of Transportation
425 W. Ottawa
Lansing, MI 48933

This copy is to be received within three working days after the due date and time specified above. Please do not deliver in person.

Any questions relative to the scope of services must be submitted by e-mail to the MDOT project manager. Any questions must be asked at least three working days prior to the due date and time specified above. All questions and their answers will be placed on the MDOT website as soon as possible after receipt of the questions. The names of vendors submitting questions will not be disclosed.

For a cost plus fixed fee contract, the selected vendor must have a cost accounting system to support a cost plus fixed fee contract. This type of system has a job-order cost accounting

system for the recording and accumulation of costs incurred under its contracts. Each project is assigned a job number so that costs may be segregated and accumulated in the vendor's job-order accounting system.

The selection team will review the information submitted and will select the firm considered most qualified to perform the engineering services based on the proposals. The selected vendor will be contacted to confirm capacity. Upon confirmation, that firm will be asked to prepare a priced proposal. Negotiations will be conducted with the firm selected.

The maximum allowable pages for the proposal are limited to the selected Tier shown on MDOT Form 5100B, which is posted with this RFP. Page limits apply to the entire proposal. The number of pages per section is the decision of the creator of the proposal.

MDOT is an equal opportunity employer and MDOT DBE firms are encouraged to apply. The participating DBE firm, as currently certified by MDOT's Office of Equal Opportunity, shall be listed in the Proposal.

The scope of services is attached to this solicitation.

SCOPE OF SERVICES
for
DEVELOPING BRIDGE REPAIR ALTERNATIVES
CS Various - JN 85568

Southwest Region 01/11/06

The Southwest Region of the Michigan Department of Transportation (MDOT) is seeking a proposal from a "Pre-Qualified" consultant firm (CONSULTANT) to evaluate various repair alternatives for a prescribed set of bridges and recommend the most economical rehabilitation or treatment. This process is termed **Bridge Scoping**.

MDOT Project Manager:	Zhizhen Liu Region Bridge Management Engineer
Address:	1501 E. Kilgore Rd Kalamazoo, MI 49001
Fax:	269-337-3039
Phone:	269-337-3932
E-mail:	liuz@michigan.gov

I. Primary Prequalification Classification:

Bridge scoping

II. Secondary Prequalification Classification:

The anticipated start date of the service is **04/24/06.**
The anticipated completion date for the service is **07/28/06**

DBE Requirement: 1**0%**

III. LOCATION

The bridges are situated in various locations in Berrien and Van Buren Counties, Michigan (see **Attachment No. 1**, Bridge Scoping Project Listing, for specific bridge numbers and locations).

IV. PURPOSE

Each year a number of bridges are selected for repairs based on many factors. Each of these bridges must have a detailed scope of work and an estimate developed prior to submitting for approval and design. The purpose of this service is to develop this scope of work and estimate for each bridge.

The deliverables will be the Scoping Reports for each bridge. The information contained in the Scoping Reports will be used by the Design Support Area to prepare rehabilitation plans. Therefore, in general terms, the content of the reports will need to be sufficient to adequately convey the general physical condition of each structure and the specific areas in need of repair.

V. DURATION AND SCHEDULE

The duration of the project has been/will be established using an average time per bridge determined from previous experience. If the CONSULTANT cannot meet these deadlines, the reason for the required extra time must be detailed in the priced proposal.

A. MEETINGS

1. Project Initiation Meeting

A mandatory Project Initiation Meeting will be held with the CONSULTANT prior to the start of the site review work. The CONSULTANT PM will be required to attend the meeting and it will be held at MDOT's office in the Region unless an alternative site is mutually agreed to.

2. Sample Report Review and Progress Meeting

A Sample Report Review and Progress Meeting will be held with the CONSULTANT during the report preparation period, prior to the draft report submittal. The MDOT PM and the CONSULTANT PM (report author) will be required to attend. A sample draft report (for one bridge) must be presented to the MDOT PM at the meeting. This report will be used to compare against the requirements of this scope of work. Questions on the report preparation may be asked at this time as well.

VI. GENERAL DESCRIPTION OF THE WORK

The work for each bridge in this scope of work is broken down into three main components: A) Site Review, B) Engineering Analysis of Findings, and C) Report Preparation.

A. SITE REVIEW

1. General

Each bridge must be visited by the CONSULTANT PM. The purpose of this visit is to locate all areas of deterioration, determine feasible repair options, associated approach work, maintenance of traffic options, and ascertain quantities. Where necessary, high-reach equipment or an under bridge inspection crane must be used to get close enough to evaluate the structural components (See Section

EQUIPMENT AND SAFETY, below).

The information collected in the field must be sufficient to determine quantities and locations of repairs and improvements. This information must be detailed in the field notes and/or sketches and these notes are to be included in the report.

a. During the site review of the bridge, the following will be done, at a minimum:

(1) Sound all concrete elements (deck, superstructure, substructure, etc.) for delaminations and unsound areas. All delaminated areas are to be marked with paint that will be evident in the photographs. All delamination surveys are part of the site review work (not part of testing). If a substructure unit needs to be replaced, a plan view of the substructures must be made showing the specific location of the areas to be replaced. The approximate size and location of areas needing substructure patching should also be shown on a sketch of the substructure unit.

The underside of the deck must be visually inspected for wet areas, map cracking, delaminations, rust along beam edges or any other evidence of deterioration. Pictures of the area must be taken and a written description of the deterioration and location must be documented for inclusion into the report.

(2) Note the type and condition of the bridge railing. Is the railing up to standard? Is a thrie beam retrofit necessary, or a railing replacement? If pedestrian fencing is present, note its condition. Guardrail on the approaches should also be evaluated.

(3) All dirt, debris, and rust scale must be removed from the ends of each of the steel beams under the joints so that the steel can be inspected for section loss. Thickness readings on the web and the bottom flange are to be taken at the thinnest locations within 12 inches of the end of the beam. These thickness readings will be compared with the original thickness and the percentages of section loss will be calculated. This data will be tabulated in a specific format (as shown in **Attachment No. 5**, Beam End thickness Table) and sketches will be prepared, of major components, showing the location of the deteriorated areas. These are to be freehand drawings, not to scale but in relative proportion and dimensioned, on 8.5" x 11" sheets.

Specifically, if beam end repairs are necessary, then a plan of the superstructure must be made showing the location of the beam ends needing repair. This information will be presented in the Appendix of the report.

(4) In other areas of heavy flaking rust, the CONSULTANT will clean as necessary to measure for any section loss. Thickness readings will be taken at the thinnest locations and recorded. Areas of section loss are to be sketched showing location and dimension.

(5) The vertical clearance of the bridge must be field verified, noted on the checklist and stated in the report. Point out any evidence of high load hits. A picture of any vertical clearance signs attached to the bridge must be taken. If the bridge has less than the minimum vertical clearance, as defined in the current MDOT Bridge Design Manual (note the section regarding minimum underclearance on "Special Routes"), then this must be considered in selecting the repair option and the options to correct the situation stated in the report. Keep in mind that raising the grade of the bridge to obtain acceptable underclearance will require additional approach work.

(6) The width of the structure must be evaluated to determine if widening is necessary to upgrade the structure to current standards (refer to the MDOT Bridge Design Manual), or for maintaining traffic during construction. The CONSULTANT will describe how and where the widening is to take place and provide a plan view sketch showing the proposed widening. Widening may also require additional approach work to transition between the roadway width and the new bridge width.

(7) The CONSULTANT must determine if part-width construction is possible or if the entire crossing must be closed and a detour used. The CONSULTANT must contact the TSC Traffic and Safety for assistance estimating the costs for maintaining traffic. Final detailed traffic control costs for construction will be determined by MDOT.

(8) Any work required for the approaches must be included in the report and these items accounted for on the Estimate Sheet. Note that widening the bridge or raising the grade to obtain minimum underclearance will require additional

approach work. Please include these associated costs in the scoping cost estimate.

b. The area immediately around the bridge must be closely evaluated to determine if there are any site issues or constraints that may have an impact during construction. These include items such as:

(1) Businesses or driveways close to the approaches.
(2) Utilities attached to or near the bridge.
(3) Signs or sign brackets attached to the bridge. Are they welded or bolted?
(4) Poor alignment or geometrics.
(5) Bank erosion or scour. Unusual channel features.
(6) Railroad tracks that have been removed from over or under the bridge.
(7) Proximity of other bridge structures.
(8) Is drainage sufficient? Any evidence of ponding on structure?
(9) Is Right-of-Way limited and might additional ROW or easements be required?

c. Additionally the following items are some that must be considered:

(1) Is the bridge historical?
(2) Does this bridge have special structural design features which may affect the repair options (e.g., non-redundant or fracture critical)?
(3) Are there environmental issues that may impact the project?
(4) If the structure is a pedestrian bridge, does it's geometrics meet current ADA Guidelines? If not, consider what repair options would be necessary to meet the guidelines set by the ADA.

If, during the site review, the CONSULTANT finds any structural condition that may cause the bridge to be load restricted (such as holes in beams), or which may require other immediate action (such as lane closures or emergency repairs to holes in the deck, etc.), the CONSULTANT will notify the MDOT PM as soon as possible. The CONSULTANT will also provide documentation of the condition (such as beam measurements) to the MDOT PM as quickly as possible.

2. Scoping Checklist and Determining Repair Options

Each bridge will be evaluated to determine the most appropriate repair option

based on the physical condition of the bridge, economic considerations, and engineering judgment. An initial determination is to be made in the field and the Scoping Checklist completed accordingly. A blank Bridge Scoping Checklist (**Attachment No. 3**) is attached and must be completed before leaving the field.

The following are the types of repair options that are to be considered (See ENGINEERING ANALYSIS for more discussion about the option choices):

a. "Hold", or defer work three to five years
b. Selective repairs
c. Overlay
    (1) Concrete overlay (Deep or Shallow)
    (2) Asphalt overlay with waterproofing membrane
    (3) Thin epoxy overlay
d. Deck replacement
e. Superstructure replacement
f. Bridge removal or replacement

The Bridge Deck Repair Matrix (**Attachment No. 2**) must be consulted for reasonable deck repair options based on the condition of the deck surface and soffit.

3. Photographs

A photo log of the bridge and the surrounding areas must be included in the report. All of the pictures must be mounted on 8 ½" X 11" media and are to be captioned with a description of what the picture is intended to show. Each copy of the bridge report must have this series of pictures showing at least the following items and sequenced in the following order:

a. Elevation views of both sides of the bridge.
b. Deck surface (entire deck surface to be photographed, including a typical of the bridge railing and joints).
c. Approaches.
d. Underside of deck (to sufficiently show condition of soffit).
e. Typical superstructure elements (beams, bearings, pin and hangar, etc.).
f. Abutments, including slope protection.
g. Piers.
h. Waterways / railroad tracks.
i. Major deteriorated areas.
j. Load posting signs.
k. Vertical clearance signs.
l. Utilities.
m. Quadrant photos, showing businesses or other items that could a affect the cost of the construction.

In addition, pictures must be taken which will support the CONSULTANT's recommendations. All pictures must be captioned to describe the picture's general view (such as north elevation, etc.) and to describe the pertinent item or deterioration. The deck surface photos will be an "aerial view" taken from a height of at least 12 feet above the surface of the deck. These photos will be taken after the deck delamination survey and the areas of delamination are expected to show clearly in the photo.

4. Testing

During the site review phase, the CONSULTANT may feel that material testing is needed to better understand the condition of the deck to evaluate the best repair option. Advance approval by the MDOT PM is required prior to initiating any testing.

If the CONSULTANT PM feels that material testing is needed, a testing proposal must be submitted to the MDOT PM for approval. The testing proposal will show the bridges for which testing is proposed, what tests are to be performed, what specific information is to be gained from the testing, how this information is to be used, and the cost of testing and necessary traffic control. Proposals submitted with insufficient justification for testing will be denied. Where the deck is beyond saving, as judged by visual indications, or where the appropriate repair option is clearly indicated, material testing will not be performed.

The results and analysis of any testing that is approved and performed will be discussed in the Site Review Findings section of the report and the actual test reports will be included in the Appendix.

B. ENGINEERING ANALYSIS

The engineering analysis phase will include an evaluation of the site review findings; the preparation of and evaluation of two or three repair strategies, including the estimate of cost of the repair strategies and the selection of the best repair option.

An initial repair option will have been determined during the site review in the field. The CONSULTANT is required to perform an engineering analysis of this option and on the options above and below it from the list in the section Scoping Checklist and Determining Repair Options. For example, if deck replacement is determined in the field to be the most appropriate repair option, the engineering analysis will also be performed on the overlay and superstructure replacement options.

For the superstructure replacement and bridge replacement options, the CONSULTANT will also analyze eliminating or correcting undesirable or deficient design characteristics (e.g., insufficient structural capacity, underclearance, width, etc.). Analysis of the load carrying capacity of the bridge will not be required.

If the final recommended repair option is different from the one determined in the field, a second Scoping Checklist for the final recommendation will be completed and included in the report.

Estimating Various Repair Options

Cost estimates for each of the Repair options will be prepared for each bridge. A standard form Estimate Sheet with unit prices will be used (**Attachment No. 4**, Bridge Cost Estimate Worksheet and Key). The Estimate Sheet, on 11" x 17" paper, provides space to show all of the repairs to be performed in each major repair year (major repair years will be in five-year increments). Calculations for the paint area will be prepared by the CONSULTANT and included in the Appendix of the report.

It is recommended that a line item be provided on the Cost Estimate for "bridge aesthetics", in the amount of 1% of the construction estimate (before mobilization or inflation is figured in).

The estimates required are "early preliminary estimates" and not the more detailed "engineering estimates." The object is to determine the most economical method of treatment and to establish the budget. The unit prices on the attachment are averages of various types of repairs, and a description of what is included in the unit price can be found in the "key". The more detailed estimates will be determined in the design phase (not a part of this scope of work).

If additional information is necessary for a unit price not on the list, contact the MDOT PM or Linda Reed, Bridge Scoping Engineer in Construction and Technology at (517) 322-5622. Questions regarding utilities and scour are to be directed to the Hydraulics Unit in the Design Support Area at (517) 335-1919.

C. REPORT

The deliverables for this scope of work will be the reports, photographs, printed worksheets, sketches, and notes. The electronic files will be submitted for all of the estimate sheets included in the report on CD and in Excel.

For each bridge, a three-ring binder containing the scoping reports as described below will be submitted. The binder will contain all information pertaining to the site review findings and recommendations for each bridge. Two sets of each binder will be submitted, first in draft form, then revised as necessary and submitted in final form.

The Report will be submitted in two phases: draft version and final version. The draft report will be a complete report, with 2 copies submitted to the MDOT PM. These will

be reviewed by the Region Bridge Engineer, Lansing Bridge Scoping Engineer. Comments and questions arising from those reviews will be given to the CONSULTANT to be incorporated into the final report if appropriate or addressed separately and submitted with the final report.

Incomplete final reports or reports with errors will be returned to the CONSULTANT for revision. Failure to make the required changes will be considered a failure to meet the terms of the scope of work.

1. Table of Contents

For complete document.

2. General Site Review Procedures

This section will summarize the general procedures used during the site reviews. This information will include a table showing the site review dates for each bridge, typical equipment used, typical traffic control procedures, typical site review procedures, etc. Any significant variations from this typical information can be stated under the section for a specific bridge.

3. Executive Summary

This is to include a statement of the recommended treatment for the bridge and the cost of the initial repair. The executive summary will be a "stand alone" section and will not refer to other sections of the report, nor will the main text refer to information in the executive summary.

4. Field Site Review Findings

This section will include, as a minimum, discussion of the following areas:

a. Overall assessment of the condition of the bridge including an evaluation of the beam end thicknesses (webs and bottom flanges) taken during the site review.

b. Site issues, i.e., geometrics, maintenance of traffic, utilities, scour, etc. In case of the situation where no site issues that would impact the rehabilitation of the structure were identified, a statement will be made that all areas were investigated and no issues were found.

c. Testing results and implications to the repair options. If no testing was performed, this will be stated in the report.

d. The following outline may be used for a consistent presentation format for the body of this section of the report:

(1) Approaches
(2) Deck (surface, soffit, joints, sidewalk, railing)
(3) Superstructure (beams, diaphragms/cross frames, paint, bearings, pin and hangar)
(4) Substructure (abutments, wingwalls, piers, slope protection, scour)
(5) Site Issues
    (a) Maintaining Traffic
    (b) Geometrics
    (c) Vertical Clearance
    (d) Signs
    (e) Utilities
(6) Material Testing

5. Rehabilitation Options

This section will include a discussion of the rehabilitation options, as described in Sections Scoping Checklist and Determining Repair Options. For each option evaluated, a discussion of the necessary improvements and the associated costs (initial construction costs) will be included. The report must discuss and state the reasoning and judgment for selection of the recommended option. This discussion will also include the reasoning for the elimination of all other options, as appropriate.

A table summarizing the initial construction cost for each of the options considered will be included in this section for ease of comparison.

6. Summary with Repair Recommendation

This section will state the recommended course of action for the bridge and the factors used in determining this recommendation. This section will also briefly discuss the effects of postponing the recommended improvements.

7. Appendix

a. Mounted photos with descriptions
b. Scoping Checklist(s)
c. Estimate Sheets
d. Field notes and sketches, including sketches of beam end repair areas, substructure repair areas, and widening options.
e. Paint calculations
f. Table of beam end thickness readings

VII. **VENDOR PAYMENT**

All invoices/bills for services must be directed to the Department and follow the 'then current' guidelines. The latest copy of the "Professional Engineering Service Reimbursement Guidelines for Bureau of Highways" is available on MDOT's Bulletin Board System. This document contains instructions and forms that must be followed and used for invoicing/billing; payment may be delayed or decreased if the instructions are not followed.

Payment to the Vendor for Services rendered shall not exceed the "Cost Plus Fixed Fee Not to Exceed Maximum Amount" unless an increase is approved in accordance with the contract with the Vendor. All invoices/bills must be submitted within 14 calendar days of the last date of services being performed for that invoice.

Direct expenses will not be paid in excess of that allowed by the Department for its own employees. Supporting documentation must be submitted, with the invoice/bill, for all billable expenses on the Project. The only hours that will be considered allowable charges for this contract are those that are directly attributable to the CE activities of this Project. Hours spent in administrative, clerical, or accounting roles for billing and support, are not considered allowable hours; there will be no reimbursement for these hours.

The use of overtime hours is not acceptable unless prior written approval is granted by the MDOT Region Engineer and the MDOT Project Engineer Manager. Reimbursement for overtime hours that are allowed will be limited to time spent on this project in excess of forty hours per person per week. Any variations to this rule should be included in the price proposal submitted by the vendor and must have prior approval by the MDOT Project Engineer Manager.

VIII. TRAFFIC CONTROL

A. TRAFFIC CONTROL AND PERMITS DURING SITE REVIEW

The traffic control during the site review will be the responsibility of the CONSULTANT. Traffic control will follow standard MDOT procedures. Permits for the traffic control and for working in the MDOT Right of Way must be obtained from the appropriate MDOT Transportation Service Center (TSC) or Region prior to the start of work. Allow ample time for permit issuance. The CONSULTANT will be responsible for obtaining all permits and notifying the Region Engineer in writing (with a copy to the MDOT PM) of the time and location of the work.

Nighttime lane closures for deck inspection may be allowed, at the discretion of the MDOT PM. Approval for nighttime or weekend work must be obtained prior to the start of work. Other traffic control restrictions may be imposed by the Region or TSC, as shown in section VII-B below.

B. REGION TRAFFIC CONTROL REQUIREMENTS

The specific Region Lane Closure Restrictions for Freeway is in the appendix as

Attachment No. 6.
For Non-Freeway, CONSULTANT should use the traffic regulatory operation for two lane roadway and close one lane in both directions for four lane roadway.

C. RAILROAD FLAGGING & PERMITS

If it is necessary to work over an active railroad during the site review phase, the CONSULTANT will be responsible for obtaining the necessary permits and flaggers. Costs for this will be considered an expense and must be detailed in the traffic control section in the Proposal and on the invoice.

IX. SOFTWARE REQUIREMENTS

The CONSULTANT is required to own and use Microsoft Excel for all spreadsheets and Word for word processing. The requested electronic files (see Section V-C, REPORT) must be submitted in these applications. Electronic file templates for all of the attachments can be provided via E-mail, or on a diskette in these applications. Contact the MDOT PM with your E-mail address or to request a diskette.

X. EQUIPMENT AND SAFETY

The CONSULTANT will be responsible for obtaining and operating the high reach equipment for inspection under the bridge. If needed, MDOT may provide an under bridge inspection crane for the CONSULTANT's use in certain situations (for example, high river and railroad crossings). The CONSULTANT will still be responsible for traffic control and for scheduling. Contact the MDOT PM prior to submitting fee proposal and a minimum of 14 days in advance for scheduling use of the equipment.

During the inspection, the CONSULTANT is responsible for traffic control and all aspects of personal safety of his or her staff. Traffic control will follow standard MDOT procedures.

All other inspection equipment and personal safety equipment such as hard hat, steel toed shoes, reflective vest, and eye protection will be the responsibility of the CONSULTANT.

XI. DIVING REQUIREMENTS

No diving of river crossings is expected as part of this work. However, if it does become necessary, it will be dealt with under a separate authorization.

XII. APPENDICES

A. ATTACHMENT NO. 1 - Bridge Scoping Project List

B. ATTACHMENT NO. 2 - Bridge Deck Repair Matrix

C. ATTACHMENT NO. 3 - Bridge Scoping Check List

D. ATTACHMENT NO. 4 - Bridge Cost Estimate Worksheet and Key

E. ATTACHMENT NO. 5 - Southwest Region Lane Closure Restriction

ATTACHMENT NO. 1 BRIDGE SCOPING PROJECT LIST

Structure ID #	Facility Carried	Feature Intersected	Locations	Last Inspection
		Coloma TSC		
B02-11021	US-12 BR (Main)	St Joseph River	At US-12 BR & US-31 BR JCT	08/09/2004
S03-80012-1	I-196 NB	20th Ave (CR380)	1.8 Mile Southwest of M-140	10/12/2004
S03-80012-2	I-196 SB	20th Ave (CR380)	1.8 Mile Southwest of M-140	10/12/2004
		Kalamazoo TSC		
B04-03032	US-31 BR (Ramp)	North Branch Creek	South Limits of Holland	05/09/2005
B03-78061	M-86	Prairie River	3.8 MI W of M-66	09/09/2005
		Marshall TSC		
S03-13082-3	I-94 EB	9 Mile Road	3.2 Mile East of M-66	08/05/2005
B02-12021	US-12	Swan Creek	2.7 Mile Northeast of Bronson	07/19/2004
R01-12021	US-12	MI South	0.8 Mile Southwest of Batavia	07/22/2004

ATTACHMENT NO. 2 BRIDGE DECK PRESERVATION REPAIR MATRIX

CONDITION STATE				REPAIR OPTIONS (c)	POTENTIAL RESULT TO NBI		
Deck Surface NBI # 58a	**Deck Surface Deficiencies % (a)**	**Deck NBI # 58**	**Deck Underside Deficiencies % (b)**		**Item # 58a Deck Surface Rating**	**Item # 58 Overall Deck Rating**	**Next Anticipated Evaluation**
N/A	N/A	N/A	N/A	CSM Activities	No Change (d)	No Change (d)	1 to 8 years
NBI = 5, 6,7	2% to 5%	NBI > 5	N/A	Deck Patch / Seal Cracks	Up by 1 pt.	No Change (d)	1 to 8 years
				Epoxy Overlay	NBI now 8, 9	No Change	10 to 15 years
		NBI ≤ 5	N/A	Deck Patch	Up by 1 pt.	No Change	1 to 8 years
				Hold	No Change	No Change	3 to 10 years
NBI = 5	5 % to 15%	N/A		Hold	No Change	No Change	3 to 10 years
				Deck Patch	Up by 1 pt.	No Change	1 to 8 years
NBI = 4 or 5	15% to 30%	NBI = 5, 6	< 10%	Deep Concrete Overlay	NBI now 8, 9	Up by 1 or 2 pts.	25 to 30 years
		NBI = 3 or 4	10% to 30%	Shallow Concrete Overlay	NBI now 8, 9	Up by 1 pt	10 to 15 years
		NBI = 2 or 3	> 30%	HMA Overlay with waterproofing membrane(e)	NBI now 8, 9	No Change	8 to 10 years
NBI = ≤ 4	>30%	NBI ≥ 5	< 5%	Deep Concrete Overlay	NBI now 8, 9	Up by 1 or 2 pts.	20 to 25 years
		NBI = 3, 4, or 5	5% to 30%	Shallow Concrete Overlay	NBI now 8, 9	Up by 1 pt	10 years
				HMA Overlay with waterproofing membrane(e)	NBI now 8, 9	No Change	5 to 7 years
		NBI = 2 or 3	> 30%	Replace Deck	NBI now 9	NBI now 9	40+ years
				HMA Cap (f)	NBI now 8, 9	No Change	1 to 3 years

a.) Percent of deck surface area that is spalled, delaminated, or patched with temporary patch material.
b.) Percent of deck underside area that is spalled, delaminated or map cracked.
c.) The “Hold” option implies that there is on going maintenance of filling potholes with cold patch and scaling of incipient spalls.
d.) Sustains the current condition longer.
e.) Hot Mix Asphalt overlay with waterproofing membrane. Deck patching required prior to placement of waterproofing membrane.
f.) Hot Mix Asphalt cap without waterproofing membrane for ride quality improvement. Deck must be replaced in 1 to 3 years and be in the 5 year plan.

BRIDGE DECK REPAIR MATRIX
USER GUIDELINES

This matrix is a tool for Bridge Engineers to use in the selection of deck repair options. The condition of the deck is usually the driving force, or the key indicator, leading to a structure being considered for rehabilitation or replacement. However, there are times when other issues effecting the bridge may elicit the need for a rehabilitation project and this matrix does not address those situations. Some of these situations are super-structure deterioration, sub-structure deterioration, and functional issues such as under-clearance and/or bridge width. Sometimes it is desirable for an entire corridor to be brought up to a specific condition level as part of an overall strategy. So the user is cautioned to interpret the information from the matrix in the context of each specific case and use engineering judgement.

The matrix can be used from left to right or from right to left. If you have scoping inspection data with a deck delamination survey, select the row in the left column that matches the percent of surface defects. Then select the row in the second column that matches the percent of underside defects. To the right of this you will find a repair option and the associated changes to the NBI and the expected service life of that repair.

If you are looking for a fix that will last for a given period of time, select a row from the right column that matches the length of service desired and scan to the left to find the repair option. Be advised that the condition of the bridge at the time of the rehabilitation affects the expected service life of the selected repair option. So if the structure is in worse condition than shown on the left side of the matrix, the repair will not last as long. Conversely, if the deck is in better condition than shown on the left, a longer service life could be expected.

This matrix has been constructed based on the best knowledge of individuals from Construction & Technology, Maintenance, and Design Support Areas, and FHWA with many years of experience working with bridges. When used in conjunction with the Bridge Inspection Report and Bridge Project Scoping Report, the matrix can be an accurate guide in the majority of situations and will lead to a repair option that is economical and consistent with the Departments goals.

ATTACHMENT NO. 3 BRIDGE REHABILITATION
SCOPING CHECKLIST

Scoping Engineer _____Structure Number_____
Route & Location _____ Date _____

Primary Repair Strategy _____ Priority _____
Structure Type _____ Proj. Dev. Engineer_____ Region _____

Length _____ft Width _____ft Deck Area _____sft

NEW BRIDGE

_____ Total bridge replacement. New size; Length _____ft,
Width _____ft, Lanes _____.

DECK REHABILITATION

_____ Patch isolated spalls. _____sft. Measured surface spalls & delams. _____ ____sft or %

	Tail Span	Main Span
Web		
Flange		
Length		
Number		

_____ Replace expansion joints. _____ft.
_____ Polymer overlay. _____sft.
_____ Bituminous cap. Bridge railing? _____ft. (Only when deck replacement is scheduled within two years.)
_____ Asphalt overlay with waterproofing membrane. Estimated patch area _____sft.
Railing?_____
_____ Concrete overlay. Deep?_____ Shallow?_____ Railing? _____ Full depth patching? _____sft.
_____ Replace deck slab. Salvage existing beams.
_____ Widen deck _____ft on existing substructure; _____ft extend substructure units.
_____ Replace entire superstructure.
_____ Other, describe;
_____

SUPERSTRUCTURE REHABILITATION

_____ Beam end repairs. Concrete _____sft. Steel _____sft.
_____ Reinforce deteriorated members with plates and/or angles. See notes.
_____ Replace pin a & hanger assemblies.
_____ All pins & hangers. Total _____
_____ Selected pin & hangers. Location _____
_____ Paint complete structure. _____sft.
_____ Zone paint under joints. _____sft.
_____ Replace bearing assemblies. _____ea. See notes.
_____ Realign rockers. _____ea. See notes.
_____ Other, describe;_____

SUBSTRUCTURE REHABILITATION

_____ Patch spalls

_____ Abutments. _____sft.
_____ Piers. _____sft.
_____ Other, describe;
_____

MISCELLANEOUS REHABILITATION

_____ Scour analysis required?
_____ Scour erosion repairs. See notes.
_____ Replace approach pavement. 40 ft each end typical.
_____ Repair slope protection. _____sft.
_____ Parks or business concerns. See notes.
_____ Other, utilities, signs, etc. Describe;
_____

SAFETY UPGRADING

_____ Replace bridge railing. _____ft, measure each side separately.
_____ Block out existing railing with thrie beam guardrail. _____ft. Measure as above.
_____ Upgrade approach guardrail _____ft & anchorage, or _____quads.
_____ Add concrete barrier between pier columns. _____ft.
_____ Add guardrail for pier protection. _____ft.
_____ Other, describe;
_____

MAINTAINING TRAFFIC RECOMMENDATIONS

_____ Part width construction.
_____ Maintain _____lanes over. Maintain _____lanes under.
_____ Upgrade _____ft of shoulders.
_____ Detour, describe; _____. Upgrade _____miles of detour route.
_____ Other, describe;_____
_____

checklist.wpd, rev. 06-01

ATTACHMENT NO. 4 BRIDGE REPAIR COST ESTIMATE WORKSHEET

- KEY -

Unit Cost Assumptions
(Revised 3/29/04)

NEW BRIDGE

Multiple spans, Concrete - add road approach, demolition, & traffic control
Multible spans, Steel - add road approach, demolition, & traffic control
Single span or Over Water - add road approach, demolition, & traffic control
Pedestrian Overpass - (abutment to abutment); includes demolition, add traffic control
Other

NEW SUPERSTRUCTURE - includes removal of old superstructure, joints, new railing.
Add road approach and traffic control.
NOTE: Assume replace-in-kind unless specific recommendation from Design
Concrete
Steel
Over Water - additional cost to the steel or concrete superstructure replacement if over water
Other

WIDENING - Per square area of widened portion of deck
Includes cost of widening substructure units, must add additional cost of widening road approach
Other

NEW DECK - includes removal of old deck, joints, new railing. Add road approach & traffic control.
Other

DEMOLITION

Entire bridge, grade separation
Entire bridge, over water
Other

SUPERSTRUCTURE REPAIR

Concrete Deck Patch - includes hand chipping
HMA Cap (no membrane) - add bridge railing if required
HMA Overlay with WP membrane - add bridge railing if required
Removal of Concrete Wearing Course or HMA Overlay - add this to overlay costs to remove existing latex, other concrete wearing course, or HMA overlay
Epoxy Overlay - does not include joint replacement
Shallow Overlay* - includes joint replacement & hydrodemolition; add bridge railing if req'd
Deep Overlay* - includes joint replacement & hydrodemolition; add bridge railing if req'd
*[Add "Removal of Concrete Wearing Course or HMA Overlay" to remove latex ovly.
PCI Beam End Repair - per beam end, $3,000 is "average".
$2,000 for simple repairs (includes cathodic protection and concrete patching),
$4,000 for extensive repairs (includes new bearing assembly and temporary supports)
Repair Structural Steel - per beam end, welded or bolted, includes temp. supports, add painting
Paint Structural Steel - includes clean and coat
Partial Painting - includes clean and coat
Pin & Hanger replacement - includes temporary supports, does not include painting

Other

SUBSTRUCTURE REPAIR

Pier repair* - (measured x 2) - includes hand chipping, add temporary supports
Pier repair over water* - (measured x 2) - includes hand chipping, add temporary supports
Pier replacement - includes removal, piles, excavation, backfill, & cofferdam or sheet piling
Abutment repair* - (measured x 2) - includes hand chipping, add temporary supports
*assumes depth of repair is 5"-6"
Temporary Supports for Substructure Repair
Slope Protection repairs - includes demolition / removal
Other

MISCELLANEOUS

Expansion Joints and Construction Joints - includes joint removal
(combined per Design - construction joint usually replaced with exp. jt of some kind)
Bridge Railing, remove and replace
Thrie Beam Railing retrofit
Deck Drains Extensions
Scour Countermeasures
Other

ROAD WORK

Approach Pavement, 9½" RC, 40' ea. end - min. approach work to tie in to new bridge deck, includes removal of existing pavement
Approach Curb & Gutter - includes C&G removal
Guardrail Anchorage to Bridge (<40') - includes GR removal
Guardrail, Type B or T - includes GR removal
for guardrail beyond GR Anchorage or to replace existing type B or T
Guardrail Ending - needed unless new GR is tied into existing GR
Roadway Approach work - when needed beyond 40', eg. transition to adjust crown or super. or add'l width needed when widening bridge or add'l length needed when raising grade
Utilities
Other

TRAFFIC CONTROL - Unit costs to be determined by Region or TSC Traffic and Safety.
Note: If bridge is within a road project, traffic control will in most cases be covered by the road project. If this is the case, please make note of it on the estimate form.

Part Width Construction
Crossovers
Temporary Traffic Signals - (price listed is from Lansing T&S)
RR Flagging
Detour
Other

CONTINGENCY - (10% - 20%) use higher contingency for small projects

MOBILIZATION - 5% maximum

INFLATION - use 4% per year, starting with year 2006

Attachment 5

ROUTE	BEGINNING MILE POINT	ENDING MILE POINT	SIX-LANE DIVIDED FREEWAY LANE CLOSURE RESTRICTION
I-94	0/State Line	22/Stevensville	Maintain a minimum of two lanes of traffic in each direction as follows:
			Noon to 11:00 p.m., Friday
			10:00 a.m. to 6:00 p.m., Saturday
			Noon to 8:00 p.m., Sunday
			Maintain a minimum of one lane of traffic in each directiion during all other times

I-94	22/Stevensville	34/I-196	Maintain a minimum of two lanes of traffic in each direction as follows:
			6:00 a.m. to 8:00 p.m., Monday through Thursday
			6:00 a.m. to 10:00 p.m., Friday
			8:00 a.m. to 7:00 p.m., Saturday
			10:00 a.m. to 10:00 p.m., Sunday
			Maintain a minimum of one lane of traffic in each directiion during all other times

ROUTE	BEGINNING MILE POINT	ENDING MILE POINT	FOUR-LANE DIVIDED FREEWAY LANE CLOSURE RESTRICTION
I-94	34/I-196	56/M-51	Maintain a minimum of one lane of traffic in each direction at all times Monday through Sunday

I-94	56/M-51	66/Mattawan	Maintain two lanes of traffic in each direction as follows:
			2:00 p.m. to 6:00 p.m., Wednesday
			2:00 p.m. to 7:00 p.m., Thursday
			noon to 8:00 p.m., Friday
			4:00 p.m. to 9:00 p.m., Sunday
			Maintain a minimum of one lane of traffic in each directiion during all other times

I-94	66/Mattawan	74/US-131	Maintain two lanes of traffic in each direction as follows:
			6:00 a.m. to 9:00 a.m. and 2:00 p.m. to 7:00 p.m., Monday through Thursday
			6:00 a.m. to 9:00 a.m. and noon to 8:00 p.m., Friday
			11:00 a.m. to 5:00 p.m., Saturday
			2:00 p.m. to 9:00 p.m., Sunday
			Maintain a minimum of one lane of traffic in each directiion during all other times

I-94	74/US-131	92/I-94 BL	Maintain two lanes of traffic in each direction as follows:
			6:00 a.m. to 8:00 p.m., Monday through Thursday
			6:00 a.m. to 10:00 p.m., Friday
			8:00 a.m. to 9:00 p.m., Saturday
			11:00 a.m. to 10:00 p.m., Sunday
			Maintain a minimum of one lane of traffic in each directiion during all other times

ROUTE	BEGINNING MILE POINT	ENDING MILE POINT	FOUR-LANE DIVIDED FREEWAY LANE CLOSURE RESTRICTION
I-94	92/I-94 BL	98/I-194	Maintain two lanes of traffic in each direction as follows:
			6:00 a.m. to 7:00 p.m., Monday through Thursday
			6:00 a.m. to 9:00 p.m., Friday
			8:00 a.m. to 7:00 p.m., Saturday
			Noon to 8:00 p.m., Sunday
			Maintain a minimum of one lane of traffic in each directiion during all other times
I-94	98/I-194	109/E. of I-69	Maintain two lanes of traffic in each direction as follows:
			7:00 a.m. to 7:00 p.m., Monday through Thursday
			7:00 a.m. to 8:00 p.m., Friday
			9:00 a.m. to 7:00 p.m., Saturday
			11:00 a.m. to 9:00 p.m., Sunday
			Maintain a minimum of one lane of traffic in each directiion during all other times
I-94	109/East of I-69	123/Jackson County Line	Maintain two lanes of traffic in each direction as follows:
			3:00 p.m. to 7:00 p.m., Friday
			2:00 p.m. to 10:00 p.m., Sunday
			Maintain a minimum of one lane of traffic in each directiion during all other times
I-69	0/State Line	47/Eaton Co. Line	Maintain a minimum of one lane of traffic in each direction at all times Monday through Sunday
I-194	0/I-94	3/Downtown Battle Creek	Maintain two lanes of traffic in each direction as follows:
			3:00 p.m. to 6:00 p.m., Monday through Friday
			Maintain a minimum of one lane of traffic in each directiion during all other times
I-196	0/I-94	47/Ottawa County Line	Maintain a minimum of one lane of traffic in each direction at all times Monday through Sunday
US-31/I-196 BL	44	47/In Allegan County	Maintain a minimum of one lane of traffic in each direction at all times Monday through Sunday
US-31	0/I-94	24/Napier Ave	Maintain a minimum of one lane of traffic in each direction at all times Monday through Sunday
US-131	28/U Avenue	31/Centre Ave	Maintain a minimum of one lane of traffic in each direction at all times Monday through Sunday
US-131	31/Centre Ave	34/I-94	Maintain two lanes of traffic in each direction as follows:
			7:00 a.m. to 9:00 a.m., Monday through Friday
			Maintain a minimum of one lane of traffic in each directiion during all other times

ROUTE	BEGINNING MILE POINT	ENDING MILE POINT	FOUR-LANE DIVIDED FREEWAY LANE CLOSURE RESTRICTION
US-131	34/I-94	39/N. of M-43	Maintain two lanes of traffic in each direction as follows:
			6:00 a.m. to 7:00 p.m., Monday through Thursday
			6:00 a.m. to 8:00 p.m., Friday
			10:00 a.m. to 7:00 p.m., Saturday
			11:00 a.m. to 6:00 p.m., Sunday
			Maintain a minimum of one lane of traffic in each directiion during all other times
US-131	39/North of M-43	49/Plainwell	Maintain two lanes of traffic in each direction as follows:
			6:00 a.m. to 9:00 a.m. and 3:00 p.m. to 7:00 p.m., Monday through Friday
			Maintain a minimum of one lane of traffic in each directiion during all other times
US-131	49/Plainwell	64/Wayland	Maintain a minimum of one lane of traffic in each direction at all times Monday through Sunday
US-131	64/Wayland	71/Kent County Line	Maintain two lanes of traffic in each direction as follows:
			6:00 a.m. to 9:00 a.m. and 3:00 p.m. to 7:00 p.m., Monday through Friday
			Maintain a minimum of one lane of traffic in each directiion during all other times
US-131 BR	US-131	Westnedge Ave	Maintain a minimum of one lane of traffic in each direction at all times Monday through Sunday